2016

Session C, 2016 First Place: Avian aggression levels in response to the Black-capped Chickadee (Poecile atricapillus) alarm call in edge habitats around Cranberry Lake Biological station

Audrey Sellepack, Jenna Holakovsky, Alexandra Grove, Joseph Retelskyj

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Joseph Retelskyj, Alexandra Grove, Audrey Sellepack, & Jenna Holakovsky

Photo by Audrey Sellepack (2016)

ESF
State University of New York
College of Environmental Science and Forestry

Background

- Mobbing behavior is an anti-predation strategy used by avian species to drive out a predator spotted in an area (Stewart 1956)

- Behavior includes calling, swooping, and directly hitting the predator (Stewart 1956)

- Alarm calls may differ in acoustic structure depending on situation leading to a more effective defense (Templeton et al 2005)

Rationale

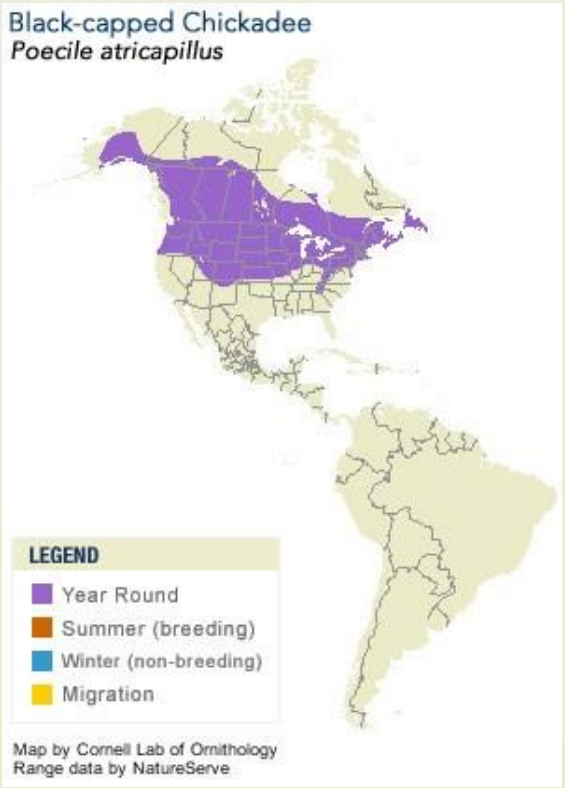
• Is the Black-capped Chickadee essential to eliciting an aggressive mobbing response to potential predators?

• The Black-capped Chickadee may have an important role in protecting a habitat by initiating mobbing (Templeton et al 2005)

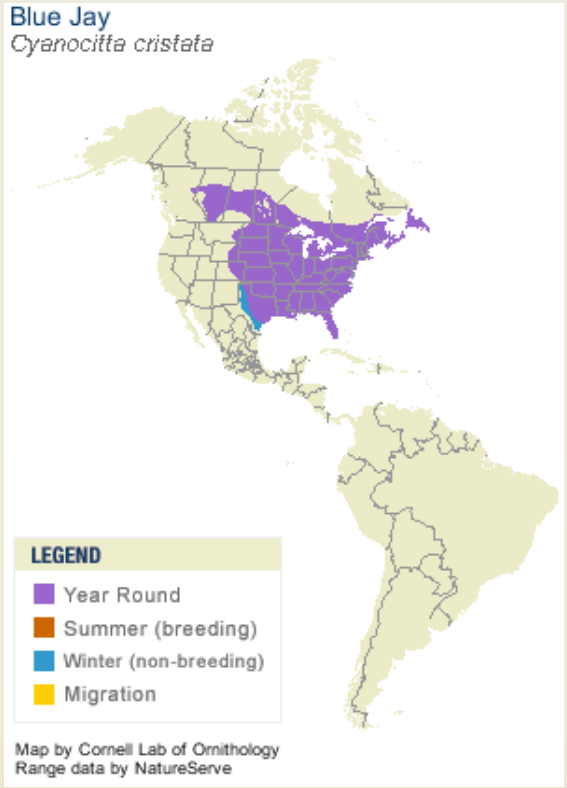
•Experimental units: Playback calls

•Sampling units: Quadrates

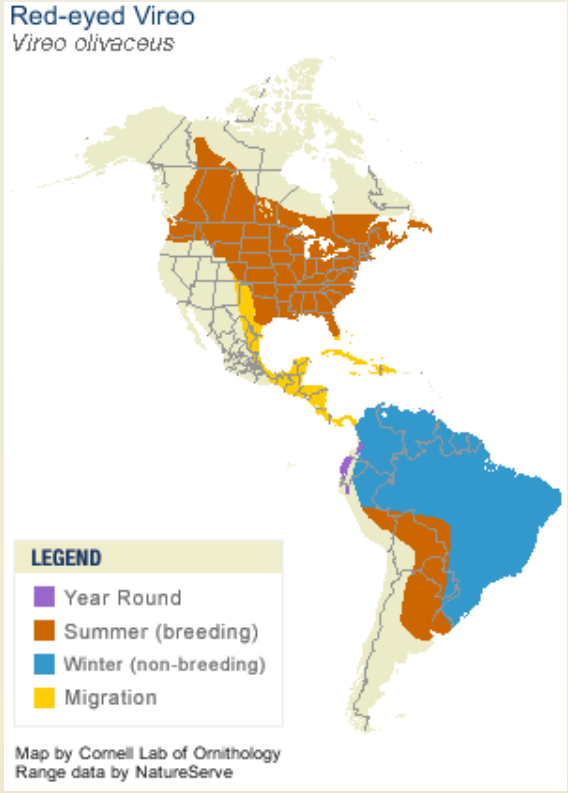
Playbacks



Black-capped Chickadee is well recognized within avian communities because it is widespread.



Blue Jay participates in mobbing, is a noisy species, and is common throughout North America.



Red-eyed Vireo has a complex song and is another common species throughout North America.

(Cornell 2015)

Hypothesis

- H_{a1} Mobbing bird species in edge habitats will exhibit more occurrences of aggressive behaviors, including high frequency calls and physical contact, in response to Black-capped Chickadee alarm calls than playbacks of Chickadee song, Blue-Jay (*Cyanocitta cristata*), and Red-eyed Vireo (*Vireo olivaceus*) alarm calls.

- H_{o1} There will be no significant difference in occurrences of aggressive behaviors between playbacks.

Hypothesis: Continued

- H_{a2} There will not be significant differences between selected edge habitats as measured by average fly-ins to our quadrates.

- H_{o2} There will be a significant difference between the selected edge habitats.

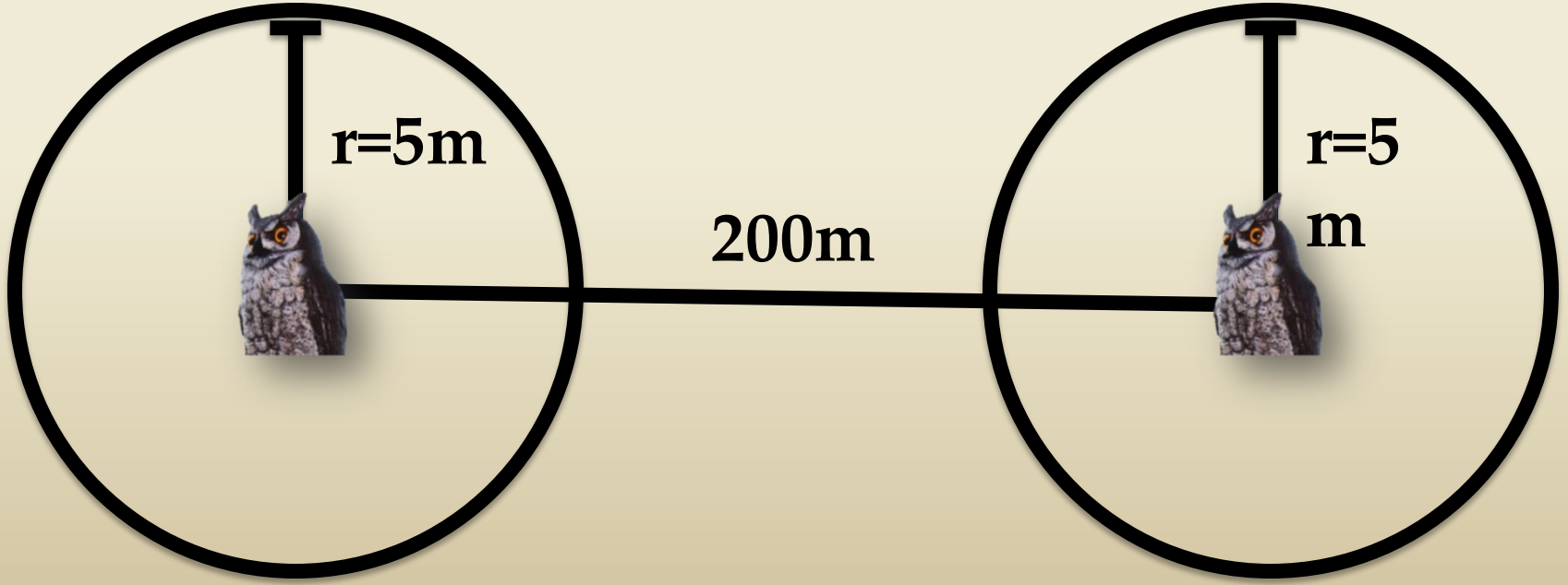
- H_{a3} There will be a significant difference between the Black-capped Chickadee alarm call and its song.

- H_{o3} There will not be a significant difference between the Black-capped Chickadee alarm call and its song.

Methods: Continued

- 5 meter radius (Doran 2005)
- 5 minute playback time (Doran 2005)

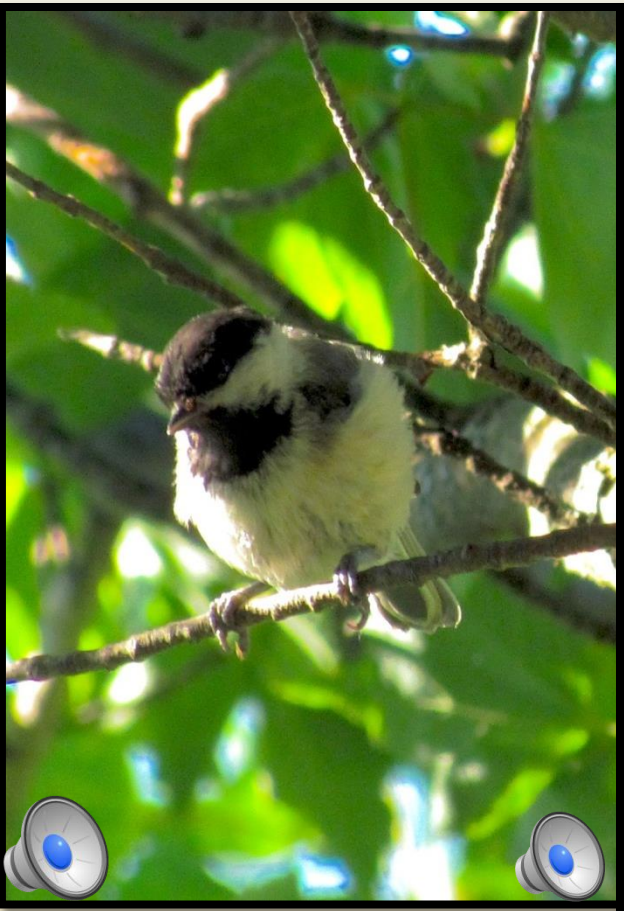
Photo by Jenna Holakovsky (2016)



Black-capped Chickadee

Blue Jay

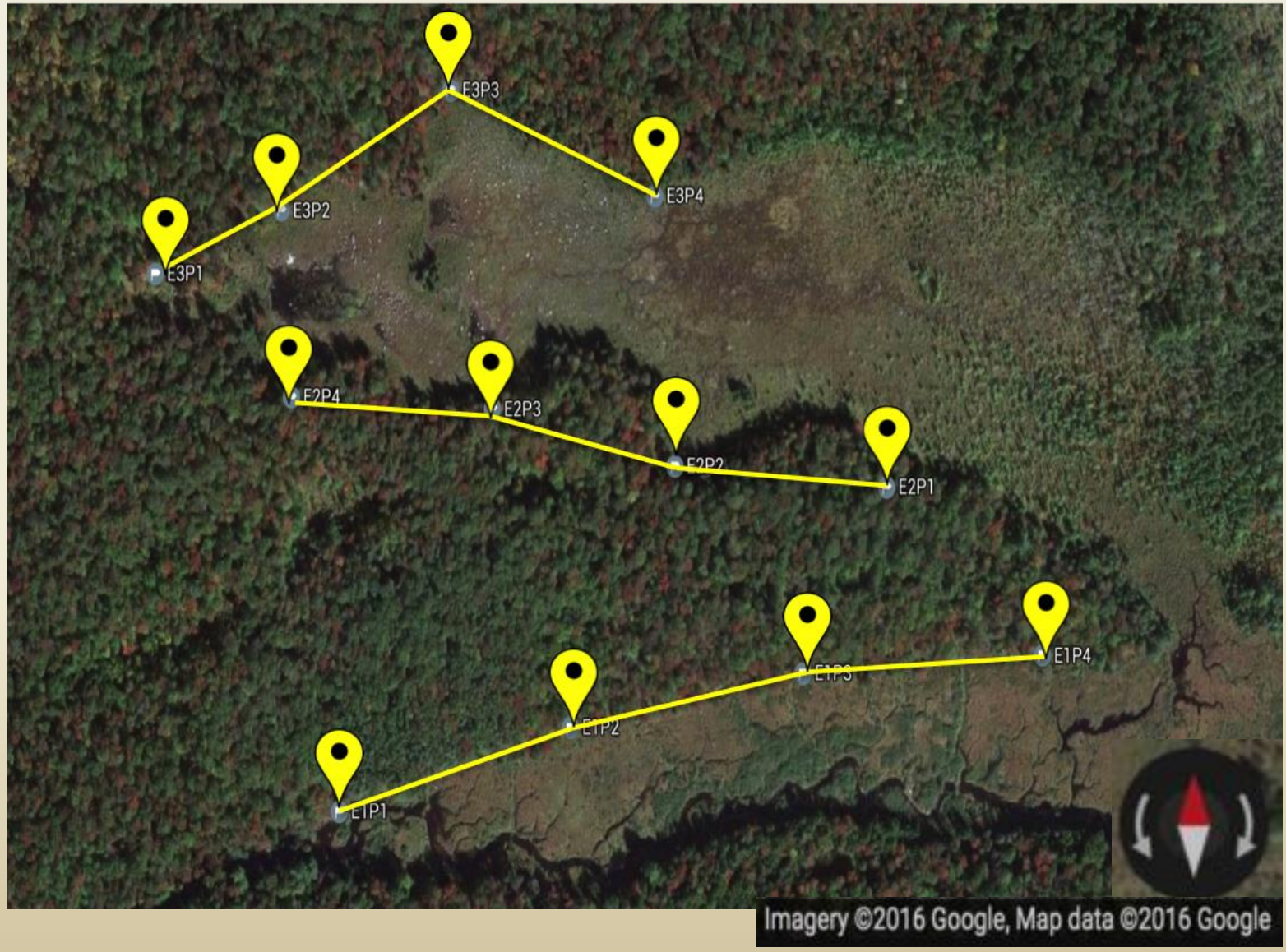
Red-eyed Vireo



Photos by Jenna Holakovsky (2016)

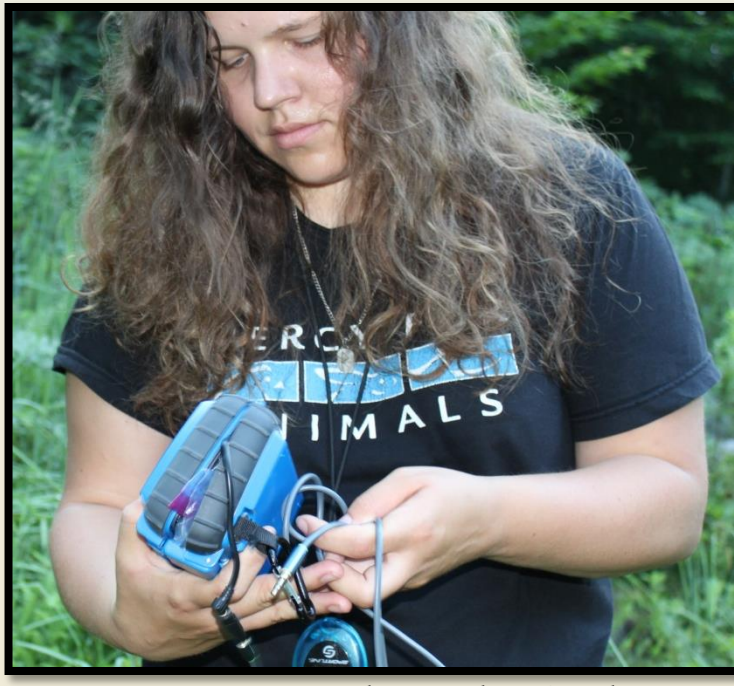
Audio: Stokes (2010)

Methods: Continued



Methods: Continued

Photos by Jenna Holakovsky (2016)



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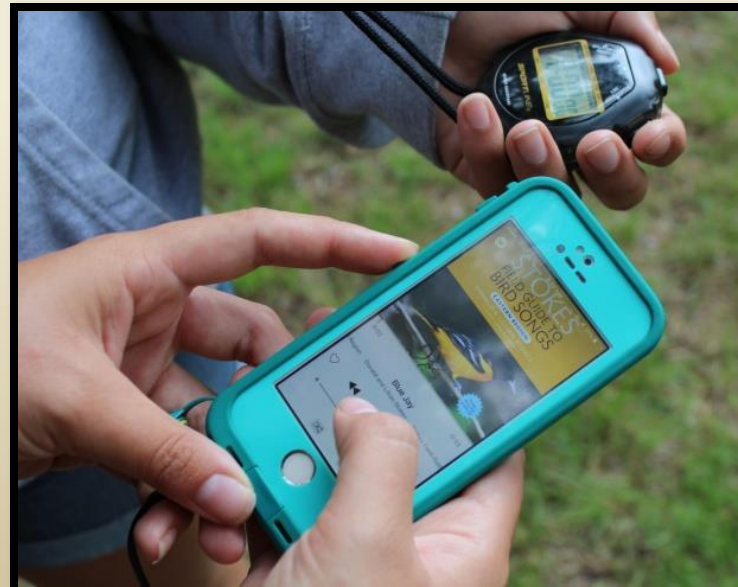

Standard Aggression Index (SAI)

Behavior Name & Code	Rank	Description
Vocalization Low-Frequency (VL)	1	Subject bird is vocalizing at low frequency; indicates low agitation; includes songs and chirps
Vocalization High-Frequency (VH)	3	Subject bird is vocalizing at a high frequency; indicates high agitation; includes alarm calls
Flight Swooping (FS)	4	Subject bird is swooping in direct vicinity of decoy owl; indicates acknowledgment of predator; warning signal; high agitation
Flight In Zone (FZ)	2	Subject bird is in flight within zone; indicates agitation; does not include slight movement from perch to perch
Hit (H)	5	Subject bird has made contact with decoy by means of pecking, scratching, projectile vomiting, projectile defecating; use of body to hit, etc.
Perching (P)	2	Subject bird has entered the proximity and is perching in the zone
Not Visible (NV)	0	Subject bird is not visible within zone

Methods: Continued

Tests: Chi-square and ANOVA

Independent variable: Playback calls

Dependent variable: Aggression levels of birds

Photo by Audrey Sellepack (2016)

Results

Beaver Pond	Forsaith Bog	Old Beaver Pond
BCCH	**BCCH**	**BCCH**
BLJA	**BLJA**	**BLJA**
BTBW	**BTBW**	**BTBW**
CEWA	**CEWA**	**CEWA**
COYE	**COYE**	**COYE**
OVEN	**OVEN**	**OVEN**
PIWO	**PIWO**	**PIWO**
REVI	**REVI**	**REVI**
WIWR	**WIWR**	**WIWR**
WTSP	**WTSP**	**WTSP**
BTGW	AMGO	AMRE
CORA	AMRE	BTGW
PIWA	HAWO	CSWA
	KILL	KILL
	MAWA	MAWA
	PIWA	PUFI
	WBNU	YRWA
	YRWA	

- 103 individuals
- 22 different species

Table 1. Alpha codes for 22 different bird species viewed over 3 different edge habitats near Cranberry Lake Biological Station, Clifton, NY. The codes in bold indicate the shared species over the three edge habitats.

Results: ANOVA

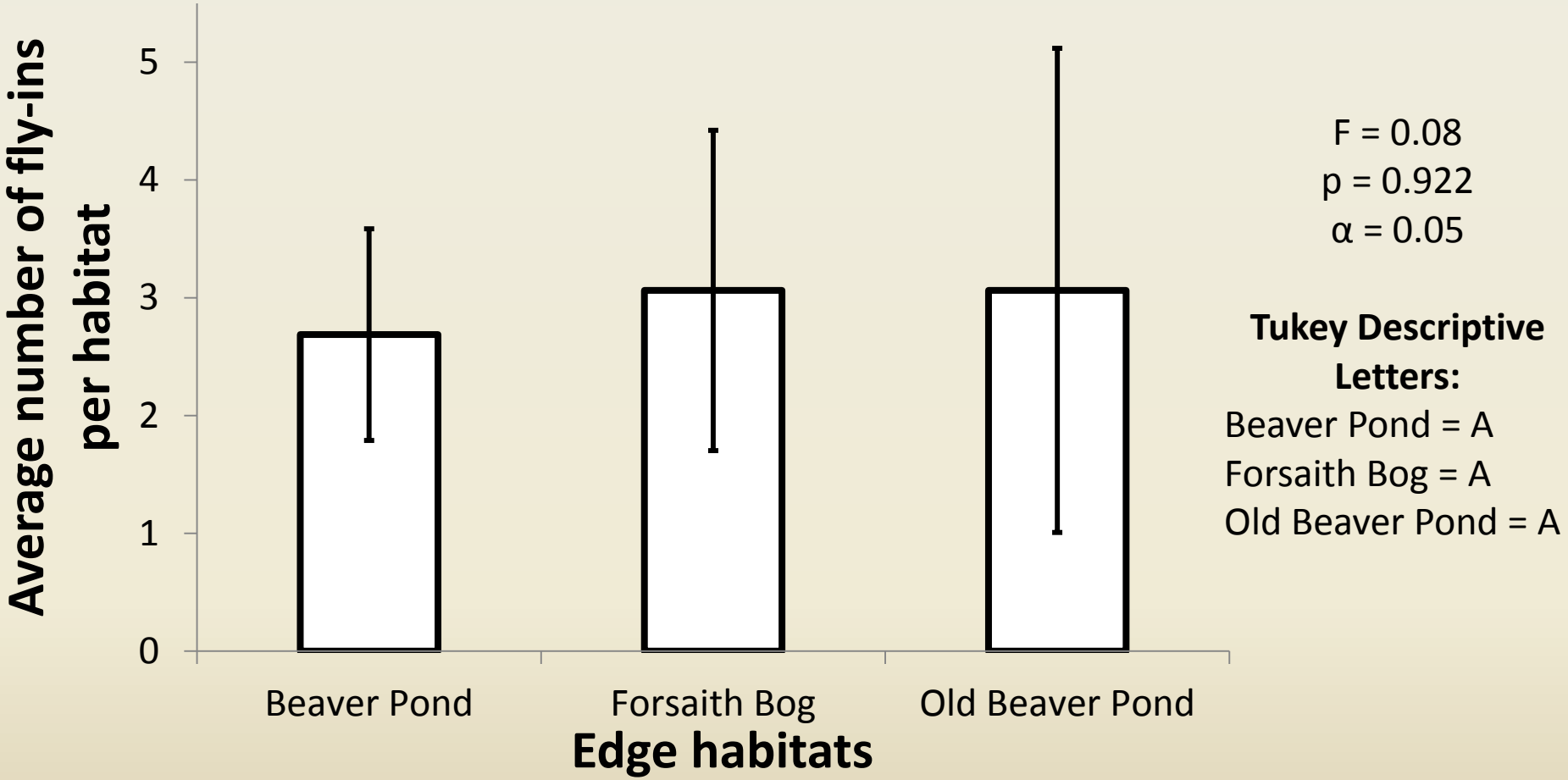

Figure 1. Average number of fly-ins in each edge habitat (+/- 1SD). Cranberry Lake Biological Station, Clifton, New York.

Results: Chi-square

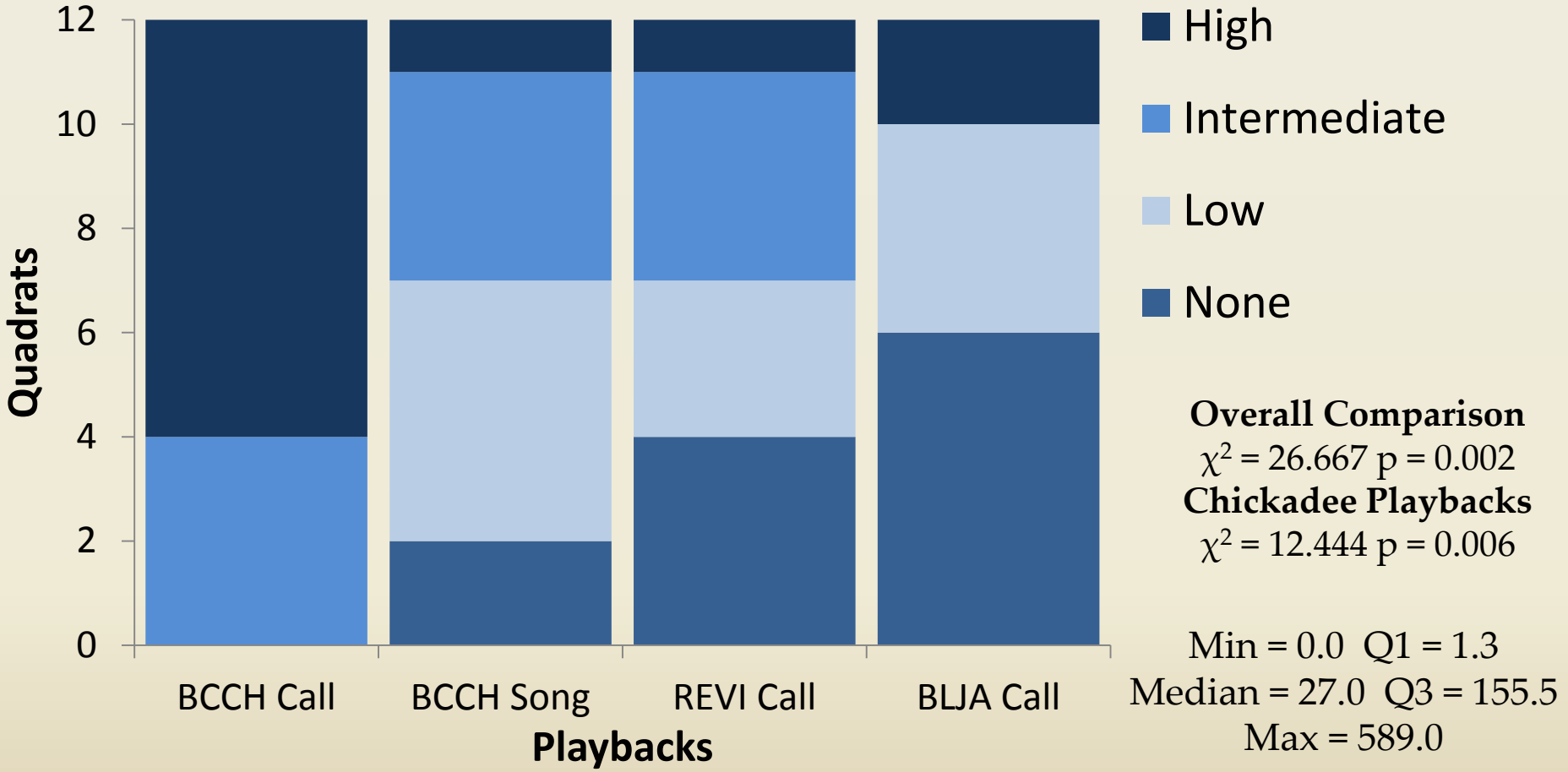

Figure 2. The distribution of observed aggression through four quadrant ranges of playbacks across a total of 12 quadrates (n=48). Cranberry Lake Biological Station, Clifton, New York.

Discussion:

We reject the null for H_{a1}

- Black-capped Chickadees had highest aggression ranks
- Discrepancies in Data

We reject the null for H_{a2}

- No difference between edge habitats

We reject the null for H_{a3}

- Significant difference between call and song

Photo by Joseph Retelskyj (2016)

Discussion:

- Bird communities coordinate anti-predatory behavior through interspecific communication (Hurd 1996)
- Local birds respond to alarm calls of *Paridae* species rather than non-*Paridae* species (Langham et al 2009)
- Birds will exhibit a wide range of mobbing behaviors around a potential predator (Curio 1978)

Photo by Audrey Sellepack (2016)

Discussion:

Methodology Drawbacks

- Larger quadrate circumference
- Additional edge habitat sites
- Further isolate transects

Photo by Audrey Sellepack (2016)

Discussion:

Potential Follow-up Studies

- Repeat study in different habitats
- Play *Paridae* alarm calls, including different species
- Black-capped Chickadees and mobbing bird mortality rates

Photo by Jenna Holakovsky (2016)

Conclusion:

- Mobbing bird species tended to behave more aggressively when a Black-capped Chickadee alarm call was played rather than a Blue Jay alarm call or Red-eyed Vireo alarm call

- Difference between Black-capped Chickadee alarm call and the Black-capped Chickadee song

- No differences between selected edge habitats

Acknowledgements

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Photo by Tyler Hodges (2016)

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Questions?

Photo by Jenna Holakovsky (2016)